Hands-on training program on Mass Spectrometry-based Proteomics and Metabolomics

BioNcube, a BIRAC-Bio incubator of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) call applications for a hands-on training program on “Mass Spectrometry Based Proteomics and Metabolomics”. ICRISAT is an International non-profit agricultural research institute with state-of-the-art facilities for Agri-biotechnology research and product translation. The training course is being organized from **November 21-25th** at ICRISAT, Patancheru, Hyderabad, India-502 324

Course description

Over the last few decades, mass spectrometry has developed into a powerful tool that is used in a variety of ways across numerous disciplines. With the aid of these technologies, we can gain a deeper understanding of plant biochemistry, which leads to important advancements. These include identifying phytochemicals with nutritional and medicinal properties, detecting biomarkers for genetic variation identification, and understanding plant defense mechanisms. Mass spectrometric instruments are used in proteomics and metabolomics to measure, characterize, and quantify proteins and metabolites.

In conjunction with this technology, it is now possible to enhance the nutritional quality of crop plants by understanding and manipulating targeted proteins and metabolites.

In recent years, mass spectrometry-based proteomics and metabolomics have emerged as powerful tools for identifying, characterizing, and quantifying proteins and metabolites important for cellular function. The purpose of this training program is to introduce proteomics and metabolomics principles, both theoretically and practically, to assist participants in better application of the principles.
BioNcube is a BIRAC-Bio incubator supporting Ag-biotech innovation, development, and applications of broad range of biotechnological solutions spreading across various domains from basic research to product translation. Agribiotech start-ups incubated in BioNcube, have access to the scientific knowledge of ICRISAT, biotechnology laboratories with state-of-the-art equipments including LC-MS, HPLC, 2-D apparatus and SDS-PAGE, and infrastructure such as plant genotyping, phenotyping and transgenic facilities, glasshouses, greenhouses, molecular biology lab, transformation facility, contained fields, etc. The value proposition of the BIRAC- Bio incubator is to link business incubation to translation and support ag-biotech start-ups from proof-of-concept stage through to technology translation and commercialization that will further benefit farming communities.

Objective

- A brief introduction to basic chromatography and mass spectrometry
- The basics of proteomics and metabolomics
- Procedural steps for the extraction of proteins and metabolites
- Sample preparation and processing for Liquid chromatography mass spectroscopy
- Data analysis and interpretation

This course will provide you with a basic understanding of mass spectrometry, sample preparation, data analysis and application(s). It is a good opportunity to gain a deeper understanding of proteomics and metabolomics studies in cells. Additionally, at the end of the program you will have the opportunity to interact with our scientists and experts to gain a better understanding of the course. It is our hope that, at the completion of this program, all the participants will be able to apply for the research areas they are interested in and develop their own workflows based on this knowledge.
Lectures

- Basic principles of mass spectrometry as well as liquid chromatography
- Introduction to Metabolomics workflow specifically non-targeted metabolomics
- Introduction to basic proteomics
- Quantitative proteomics strategies such as label free quantification
- Integration of metabolomics and proteomics approaches to identify candidate genes responsible for biotic stresses
- Intellectual property issues in access and sharing data.

Practical sessions

- Protein extraction and quantification
- SDS-PAGE and gel staining
- 2D-Gel electrophoresis
- In gel and in-solution digestion
- HPLC demonstration
- Metabolite extraction
- Sample preparation for LCMS
- Data analysis and interpretation
- Intellectual property.
Applications are invited from researchers who are familiar with basic molecular and cell biology techniques and want to learn proteomics and metabolomics applications in agriculture using the most recent and advanced Mass spectrometry systems. While previous experience in this technology is not required, it is expected that the participants have fundamental knowledge and working experience on chromatography. The application can be accessed from the following link format provided in the brochure.

https://forms.office.com/r/k67GbryAhF

The completed application should be submitted through the link or sent to bioncube@cgiar.org with copy to wricha.tyagi@cgiar.org; k.yogendra@cgiar.org, and P.Sudhakarreddy@cgiar.org.

The due date for application is 10th November 2022

Resource persons/trainers

Resource persons for this course would be from National and International Research organizations.

Course fees

- **Students/Postdoc**
  - INR 20,000 (without accommodation)
  - INR 35,000 (with accommodation)

- **Scientist/Faculty**
  - INR 25,000 (without accommodation)
  - INR 40,000 (with accommodation)

- **Industry**
  - INR 50,000 (with accommodation)

Course language

All course notes and lectures will be in English. Therefore, participants should have a good knowledge of English and of the appropriate technical terms of metabolomics and proteomics technology.

Venue

The venue for the training program is Platform for Translational Research on Transgenic Crops (PTTC) building, ICRISAT Campus, Patancheru, Hyderabad.

Accommodation

The participants will be accommodated in the Guest House/Hotel during the course of the training. The cost of any additional stay (beyond the dates of training) would be at trainees own expense. Information on extended stay needs to be given in advance.

More information

Additional information on the course will be provided to all the participants who are selected for admission to the course.
# Application Form

**Title (Dr/Mr/Ms/Mrs)**  

**Gender (M/F)**  

**First Name**  

**Middle Name**  

**Family Name**  

**Designation/Job title**  

**Organization (with address)**  

State/Province; City; Postal/Zip Code; Country  

**Date of Birth (age in years)**  

**Email (give primary and alternate email, if available)**  

**Mobile No.**  

**Phone No.**  

## Educational Qualifications (Ph.D./Postdoc/Young Scientist/any other)

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**How did you find about the training (Restrict to 100 words)**

**Describe your responsibilities and job description: (Restrict to 300 words)**

**How will this training help you? (Restrict to 300 words)**

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Full Name of Applicant.................................................................................................................... Date........................................ Signature..................................................

Remarks and Recommendations of the Host Organization (Please state clearly the strong and weak points about applicant and how this training will be useful for your organization/country)

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Date.................................................................................... Signature..................................................... Place..........................................................................

Name of Forwarding Authority.......................................................................................................... Seal.............................................................................